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Warren S. Heit
Name

Signature

April 18, 2007
Date

APPEAL BRIEF

This is an appeal, pursuant to 37 C.F.R. §41.37 from the decision of the Examiner in the above-identified application, as set forth in the Final Office Action wherein the Examiner finally rejected appellants' claims. The rejected claims are reproduced in the Appendix A attached hereto. A Notice of Appeal is filed herewith.

The fee of \$500 for filing a Notice of Appeal and the fee of \$500 for filing an Appeal Brief (Large Entity) pursuant to 37 C.F.R. §41.20(b)(2) is submitted herewith. A Petition for the three-month extension of time is enclosed herewith along with the fee of \$1,020. The Commissioner is hereby authorized to charge any additional fees in connection with this application to White & Case Deposit Account No. 50-3672.

REAL PARTY IN INTEREST

The assignee, Trek Technology (Singapore) Pte. Ltd., of applicants, Chong Seng Cheng and Teng Pin Poo, is the real party of interest in the above-identified U.S. Patent Application.

RELATED APPEALS AND INTERFERENCES

There are no other appeals and/or interferences related to the above-identified application at the present time.

STATUS OF CLAIMS

Claims 1-21 have been cancelled. Claims 22-30 have been rejected. Claims 22-30 are on appeal.

STATUS OF AMENDMENTS

There is no new amendment to claims 22-30 at the present time.

SUMMARY OF CLAIMED SUBJECT MATTER

Independent Claim 22

Appellants' invention is directed to a portable data storage device that plugs directly into a computer's Universal Serial Bus (USB) port. *See* Specification, page 1, lines 3-4; page 1, line 24 to page 2, line 4; page 5, lines 18-19. The portable data storage device of the present invention provides advantages over conventional data storage devices, which generally fall into two categories. *See* Specification, page 1, line 6 to page 2, line 11. The first category is electronic, solid-state memory devices such as read-only memories (ROMs) and random access memories (RAMs). *See* Specification page 1, lines 6-11. These prior art memory devices are typically internal to a computer and are not removable or portable. *See id.* The second category of prior art memory devices is surface-based data storage devices in which data is typically stored on the surface of, e.g., a magnetic disk or a Compact Disk (CD). *See* Specification, page 1, lines 13-22. The prior art memory devices falling into this second category typically require a mechanical drive mechanism to read the data on them. *See id.* The combination of these storage devices and the drive mechanism is generally bulky and/or delicate because of the moving parts in them. *See id.*

The portable data storage device according to the present invention functions portably like a magnetic disk or a CD but eliminates the moving parts and the mechanical drive mechanism by employing as its storage media the electronic, solid-state memory devices. *See* Specification page 1, line 24 to page 2, line 11.

As illustrated in Figure 1 of the parent PCT application, reproduced below, the portable data storage device 10 according to the present invention includes a USB plug 1, which is coupled to a USB interface device 2, which is coupled to a micro-controller 3, which is coupled to a flash memory 4. *See* International PCT application No. PCT/SG00/00029, (priority application for the present national phase application, reproduced as Appendix B3: Evidence Appendix to the present Appeal Brief), Specification page 3, lines 22-24. The micro-controller 3 includes a read-only memory (ROM) 5, which stores a program to control the operations of the micro-controller 3. *See* Specification page 3, line 24 to page 4, line 2.

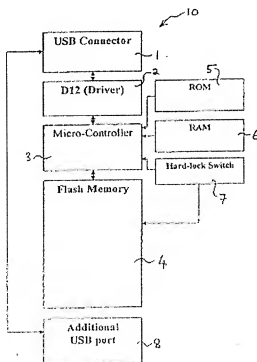


Figure 1. Appellants' PCT Application

GROUND OF REJECTION TO BE REVIEWS ON APPEAL

A. Written Description

Whether claims 22 – 29 are unpatentable under 35 U.S.C. § 112, ¶ 1 as failing to comply with the written description requirement.

B. Prior Art - Anticipation

Whether claims 22 – 24 and 26 – 28 are unpatentable under 35 U.S.C. § 102(e) as being anticipated by *Miller* (U.S. Patent No. 6,038,320) (hereafter “*Miller*”) and by *Gilbert* (U.S. Patent No. 6,457,099) (hereafter “*Gilbert*”).

C. Prior Art - Obviousness

Whether claim 25 is unpatentable under 35 U.S.C. § 103(a) as being obvious over *Miller* in view of *Kondo et al.* (U.S. Patent No. 6,786,417) (hereafter “*Kondo*”) and over *Gilbert* in view of *Kondo*.

Whether claims 29 and 30 are unpatentable under 35 U.S.C. § 103(a) as being unpatentable over *Margalit et al.* (U.S. No. 6,748,541) (hereafter “*Margalit*”) in view of *Jha et al.* (U.S. Patent 6,407,949) (hereafter “*Jha*”).

ARGUMENTS

A. Written Description

Claims 22 – 29 stand rejected under 35 U.S.C. 112, ¶ 1 as failing to comply with the written description requirement.

Proper Legal Standard

To comply with 35 U.S.C. § 112, ¶ 1, “the disclosure need only reasonably convey to persons skilled in the art that the inventor had possession of the subject matter in question.” *Fujikawa v. Wattanasin*, 93 F.3d 1159, 1570 (Fed. Cir. 1996); *Fiers v. Revel*, 984 F.2d 1164,

1170 (Fed. Cir. 1993); *In re Kaslow*, 707 F.2d 1366, 1375 (Fed. Cir. 1983); *see also Vas-Cath v. Mahurkar*, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991). “The [Federal Circuit] and its predecessor have repeatedly held that claimed subject matter ‘need not be described in *haec verba*’ in the specification to satisfy the written description requirement.” *Univ. of Rochester v. G.D. Searle & Co.*, 358 F.3d 916, 922-23 (Fed. Cir. 2004). When the express or inherent support in the specification is not present, implicit support in the disclosure will suffice. *See* MPEP 2163(I)(B) (8th ed., August 2006) (“While there is no *in haec verba* requirement, newly added claim limitations must be supported in the specification through express, implicit, or inherent disclosure.”). Particularly, “the absence of definitions or details for well-established terms or procedures should not be the basis of a rejection under 35 U.S.C. 112, paragraph 1, for lack of adequate written description.” MPEP 2163(II)(A)(1) (8th ed., August 2006).

Claim Language at Issue

Based upon the legal standard discussed above, again, the specification reasonably conveys to persons skilled in the art that the inventor had possession of the claimed invention and that the specification expressly, implicitly, or inherently supports all of the limitations in the claim language.

Claim 22 (as amended) recites, in pertinent part:

22. A unitary portable data storage device which can be directly plugged into a universal serial bus (USB) socket of a computer and which is operative to function as an alternative to a magnetic disk or compact disk (CD), and which is capable of storing software for installation to the computer or of receiving and storing user's data present in the computer, the unitary portable data storage device comprising:

a USB plug integrated into the unitary portable data storage device without an intervening cable capable of coupling the unitary portable data storage device directly to a USB socket on a computer;

* * *

a non-volatile solid-state memory, said memory being non-removable from the unitary portable data storage device and having

*sufficient capacity to enable the unitary portable data storage device to serve as an alternative to a magnetic disk or CD; and
a memory controller, the memory controller being coupled
between the interface and the memory to control the flow of data
between the memory and the USB plug in a manner to enable the
unitary portable data storage device to serve as an alternative to a
magnetic disk or CD.*

(Emphasis added).

Specifically, the Examiner objected to the phrases “without an intervening cable,” “directly,” “unitary,” “integrated,” “non-removable,” and “having sufficient capacity . . . to serve as an alternative to a magnetic disk or CD.” Applicants address these objections in several segments as follows.

“USB plug . . . without an intervening cable capable of coupling . . . directly to a USB socket on a computer.”

The proper legal standard under 35 U.S.C. § 112 is that “the disclosure need only reasonably convey to persons skilled in the art that the inventor had possession of the subject matter in question.” *Fujikawa*, 93 F.3d at 1570; *Fiers*, 984 F.2d at 1170; *In re Kaslow*, 707 F.2d at 1375; *see also Vas-Cath*, 935 F.2d at 1563-64. In addition, the MPEP advises that implicit support in the specification suffice. *See* MPEP 2163(I)(B) (8th ed., August 2006). Particularly, “the absence of definitions or details for well-established terms or procedures should not be the basis of a rejection under 35 U.S.C. 112, paragraph 1, for lack of adequate written description.” MPEP 2163(II)(A)(1) (8th ed., August 2006) (emphasis added).

Applicants’ specification discloses a portable data storage device that plugs into a computer’s Universal Serial Bus (USB) port. *See* Specification page 1, lines 3-4; page 1, line 24 to page 2, line 4; page 5, lines 18-19. “[T]he Examiner agrees that the specification discloses that a USB plug of the disclosed [portable data storage] device [] is plugged into a USB socket on a computer.” *See* p. 11 of the 2-3-2006 Office Action. The Examiner, however, questions “whether this connection is **direct** and **without a cable**.” *See id.*

Applicants respectfully submit that by disclosing a USB plug plugged into a USB socket on a computer, Applicants have already fully met their burden of “convey[ing] to persons skilled in the art that the inventor had possession of the subject matter in question[.]” *i.e.*, a portable storage device with a USB plug capable of being plugged **directly** into the USB socket on a computer **without an intervening cable**. *Fujikawa*, 93 F.3d at 1570; *Fiers*, 984 F.2d at 1170; *In re Kaslow*, 707 F.2d at 1375; *see also Vas-Cath*, 935 F.2d at 1563-64. The reason is that, at the time of the invention, “USB” was a “well-established term” that did not require detailed written description in the specification. *See* MPEP 2163(II)(A)(1) (8th ed., August 2006). As a skilled artisan would understand, when the USB plug disclosed in the specification is plugged into a USB socket on a computer (as agreed by the Examiner), such USB plug must be plugged **directly** into the USB socket on the computer **without an intervening cable** under the USB Specification. *See* paragraph 17 on pp. 8-9 of *Affidavit of John Hyde under 37 CFR 1.132* (submitted in the present application on November 28, 2005, also provided without exhibits in Appendix B1: Evidence Appendix to the present Appeal Brief, hereafter *Hyde Affidavit*); *see also* paragraphs 16-18 on pp. 4-5 of *Affidavit of Yongmin Kim under 37 CFR 1.132* (submitted in the present application on March 21, 2005, also provided without exhibits in Appendix B2: Evidence Appendix to the present Appeal Brief, hereafter *Kim Affidavit*) Consequently, Applicants believe that claims 22 – 29 are fully supported by the specification as required under 35 U.S.C. § 112, first paragraph in terms of “**directly**” and “**without an intervening cable**.”

In addition, Applicants respectfully submit that the possibility of an intervening cable did not even exist since such intervening cable was not permitted by the USB Specification at the time of the invention. As mentioned above, Applicants’ specification specifically discloses that the USB plug 1 of the claimed device 10 is plugged into a USB socket on a computer, as already agreed by the Examiner. *See* Specification page 5, lines 18-19; *see also*

p. 11 of the 2-3-2006 Office Action. At the time of the invention, the USB Specification did not permit an intervening cable between a USB plug and a USB socket. *See* paragraph 17 on pp. 8-9 of *Hyde Affidavit*. Therefore, as would be understood by a skilled artisan at the time of the invention, Applicants' disclosure that the USB plug is plugged into a USB socket on a computer has under the USB Specification inevitably led to the disclosed USB plug's capability of being **directly** plugged into a USB socket on a computer **without an intervening cable**. *See id.*

Furthermore, the USB socket on a computer would be understood by a skilled artisan to be an "A"-type USB socket. As a result, the disclosed USB plug 1 would also be understood by a skilled artisan to be of the "A"-type so that such "A"-type USB plug 1 can plug into the "A"-type USB socket on a computer. *See* paragraphs 15-17 on p. 5 of *Kim Affidavit*. In Figure 1, Applicants' specification additionally discloses the use of the D12 component 2 coupled to the "A"-type USB plug 1. As would be understood by a skilled artisan, such coupling between the D12 component 2 and the "A"-type USB plug 1 would be through a printed circuit board (PCB). *See* paragraph 22 on pp. 10-11 of *Hyde Affidavit*; *see also* paragraph 19 on p.5 of *Kim Affidavit*. A skilled artisan would understand that no intervening cable would exist between the D12 component 2 and the disclosed "A"-type plug 1 because both of them would be integrated on the same PCB. *See* paragraph 22 on pp. 10-11 of *Hyde Affidavit*; *see also* paragraph 19 on p.5 of *Kim Affidavit*.

Based upon the above discussion, Applicants respectfully submit that claims 22 – 29 are fully supported by the specification as required under 35 U.S.C. § 112, first paragraph in terms of "**directly**" and "**without an intervening cable**."

“USB plug integrated into the unitary portable data storage device without an intervening cable . . .” and “Said memory being non-removable . . .”

Again, the proper legal standard under 35 U.S.C. § 112 is that “the disclosure need only reasonably convey to persons skilled in the art that the inventor had possession of the subject matter in question.” *Fujikawa*, 93 F.3d at 1570; *Fiers*, 984 F.2d at 1170; *In re Kaslow*, 707 F.2d at 1375; *see also Vas-Cath*, 935 F.2d at 1563-64. In addition, according to the MPEP, implicit support in the specification suffices. *See* MPEP 2163(I)(B) (8th ed., August 2006).

Throughout the entire specification, the disclosed portable data storage device is shown as a single, whole, non-separable device 10 in Figure 1 and is always referred to as “a portable data storage device” or “the portable storage device” in the *singular* form. *See, e.g.*, Specification page 1, lines 3 – 4, lines 24 – 25; page 2, lines 8 – 9; page 3, lines 12, 15 – 20 and 22; and page 4, line 21.¹ One passage in the specification, “[i]f the installation of the software is complete, . . . the device 10 may then be removed [] from the USB socket on the computer” (italics supplied), describes the entire device 10 as being removed from the socket in one single motion. *See* page 7, lines 19-22. A skilled artisan, reading these disclosures, alone or together, would understand that Applicants were in possession of a unitary and integrated portable device that can be manipulated as “one” device.

The Examiner seems to be concerned with the possibility that a “single device” may still have multiple non-integrated components removable by a user. Applicants respectfully

¹ The term “a” used throughout the entire specification in reference to the device 10 suggests that its elements are all part of the unitary and integrated device with no user-removable component. *See North Am. Vaccine, Inc. v. American Cyanamid Co.*, 7 F.3d 1571, 1575-76 (Fed. Cir. 1993) (where there is no indication in the patent specification that the inventors intended the term “a” to have other than its normal singular meaning it was proper to limit the claims to a singular device). *See also Abtox, Inc. v. Exitron Corp.*, 122 F.3d 1019, 1023-24 (Fed. Cir. 1997) (*opinion amended on other grounds*) (use of the article “a” in connection with the element “metallic gas-confining chamber” suggests a single chamber, and repeated references to “said chamber” in various portions of the device are described in the claim reinforces the singular nature of the chamber).

submit that, even if such possibility exists (which it actually does not as will be explained below), Applicants, by (i) disclosing the claimed device's singular nature and (ii) never mentioning any removable or non-integrated component, have fully met their burden of "convey[ing] to persons skilled in the art that the inventor had possession of the subject matter in question[.]" *i.e.*, a **unitary** portable storage device with all parts **integrated** and **non-removable**, as discussed in the previous paragraph. *Fujikawa*, 93 F.3d at 1570; *Fiers*, 984 F.2d at 1170; *In re Kaslow*, 707 F.2d at 1375; *see also Vas-Cath*, 935 F.2d at 1563-64. In addition, Applicants respectfully submit that a device **designed** to include **multiple** non-integrated or user-removable **components** during the device's **normal course of usage** will not be understood by a skilled artisan as a **single** or **singular** device as multiple components are factually not single or singular.

Furthermore, as mentioned before, a skilled artisan would understand that the employment of a Philips D12 component 2 for device 10 in Figure 1 of the specification would result in the USB plug 1 and the D12 component 2 being integrated on the same PCB. *See* paragraph 22 on pp. 10-11 of *Hyde Affidavit*; *see also* paragraph 19 on p. 5 of *Kim Affidavit*. Also, a skilled artisan would understand that, unlike certain types of memory chips that are intended to be removable from the device in which the chips are installed, flash memory chips are fixedly installed within a device and are "non-removable" under normal usage of the device. *See* paragraph 28 on p. 7 of *Kim Affidavit*. These expert opinions further support Applicants' position that the specification teaches a unitary portable mass-storage device with an integrated USB plug and a non-removable flash memory.

Based upon the above discussion, Applicants respectfully submit that claims 22 – 29 are fully supported by the specification as required under 35 U.S.C. § 112, first paragraph in terms of "**unitary**," "**integrated**," and "**non-removable**."

As further evidence that Applicants' specification discloses a unitary, integrated portable memory device with non-removable parts, Applicants' specification describes a "portable data storage device . . . which does not include *moving parts* . . ." in lines 8-10 on page 2 (emphasis added). If the USB plug is not "integrated" and is instead coupled to the rest of the device through an "intervening cable," then clearly the flexibility of the cable will allow the USB plug to move. Likewise, if the memory is not "non-removable" and instead can be separated from the rest of the device by a user, then clearly the mobility of the memory after being separated by the user results in at least one part that moves relatively to other part(s). These situations will directly contradict the clear disclosure of a "portable data storage device . . . which does not include *moving parts* . . ." and hence will not be permissible.

The Examiner seems to believe that the existence of a unitary and integrated device with moving parts, such as a hard disk drive, disproves that a device without any moving part is unitary and integrated. See 2-3-2006 Office Action, p. 13. Applicants respectfully disagree. Rudimentary logic reasoning reveals: the assertion that "all women are people" does not lead to the conclusion that "all people are women." That is, the assertion that "all women are people" remains true even though some people are not women. Similarly, Applicants' assertion that "all devices without any moving parts must be unitary and integrated" remains true even though some unitary and integrated devices are not without moving parts.

For at least the forgoing reasons, Applicants have clearly and reasonably conveyed to those skilled in the art that Applicants were in possession of a *unitary* portable data storage device having a USB plug *integrated* into the unitary portable data storage device without an intervening cable and including a *non-removable* memory. As such, claims 22 – 29 comply

with the requirement under 35 U.S.C. § 112, first paragraph in terms of “unitary,” “integrated,” and “non-removable.”

“Said memory . . . having sufficient capacity to enable the unitary portable data storage device to serve as an alternative to a magnetic disk or CD”

Once again, Applicants submit that “the disclosure need only reasonably convey to persons skilled in the art that the inventor had possession of the subject matter in question.” *Fujikawa*, 93 F.3d at 1570; *Fiers*, 984 F.2d at 1170; *In re Kaslow*, 707 F.2d at 1375; *see also Vas-Cath*, 935 F.2d at 1563-64. Furthermore, according to the MPEP, implicit support in the specification suffices. *See* MPEP 2163(I)(B) (8th ed., August 2006).

The Examiner stated that “[t]he disclosure is silent as to whether Applicants’ device was meant to have enough capacity to serve as an alternative to magnetic disks and CDs.” *See* 2-3-2006 Office Action, pp. 13-14. Applicants respectfully disagree. Applicants’ specification, by first describing the shortcomings of magnetic disks or CDs and then introducing the advantage of the claimed invention over such magnetic disks or CDs, clearly intends for the claimed invention to serve as an alternative to magnetic disks or CDs.² Because the specification clearly intends for the claimed invention to serve as an alternative to magnetic disks or CDs, a skilled artisan would understand that the inventors were in possession of a portable memory device with a memory having sufficient capacity to enable the unitary portable data storage device to serve as an alternative to a magnetic disk or CD. The reason is that, if not providing at least the same level of *storage capacity* as that in a

² “[M]agnetic disks and CD ROMs . . . require a meehanical drive meehanism to be installed in or coupled to the computer to permit the data on the storage device to be read by the computer. . . . [T]he combination of the storage device and the drive meehanism for reading data from the storage device is generally bulky and/or delicate due to the moving parts that are required within the drive meehanism and/or storage device. . . . An advantage of the invention is . . . to provide a portable data storage device . . . which does not include moving parts or require a mechanical drive meehanism to read the data from the data storage device.” *See* Specification, pages 1-2.

magnetic disk or CD, the claimed invention will not be a viable alternative to magnetic disks and CDs.³ This will directly contradict the intention clearly disclosed in the specification as described above. Hence, by unambiguously disclosing the intention for the claimed invention to serve as an alternative to magnetic disks and CDs, the specification has expressly, implicitly, or inherently supported the claimed invention's *storage capacity* to be at least comparable to that of a magnetic disk or CD.

As a result, Applicants have clearly and reasonably conveyed to those skilled in the art that Applicants were in possession of a unitary portable data storage device having a memory with *sufficient capacity* to enable the unitary portable data storage device to serve as an alternative to a magnetic disk or CD. As such, claims 22 – 29 comply with the requirement under 35 U.S.C. § 112, first paragraph in terms of “*sufficient capacity*.”

The Examiner suggests that Applicants' contention above would render Applicants' claims indefinite because “the specification is silent as to the storage capacity of the claimed device.” See 2-3-2006 Office Action, p. 16. Applicants respectfully disagree and submit that, as mentioned above, the specification, by first describing the shortcomings of magnetic disks or CDs and then introducing the advantage of the claimed invention over such magnetic disks or CDs, clearly intends for the claimed invention to serve as an alternative to magnetic disks or CDs. Because the specification clearly intends for the claimed invention to serve as an alternative to magnetic disks or CDs, a skilled artisan would understand that the inventors were in possession of a portable memory device with a memory having sufficient capacity to enable the unitary portable data storage device to serve as an alternative to a magnetic disk or CD. The reason is that, if not providing at least the same level of *storage capacity* as that in a

³ This would put a *lower limit* of the storage capacity of the claimed invention of 1.44 MB, the capacity of the floppy disk it was designed to replace. That is, the claimed device would have at least 1.44 MB of memory capacity.

magnetic disk or CD, the claimed invention will not be a viable alternative to magnetic disks and CDs. This will directly contradict the intention clearly disclosed in the specification as described above. Hence, by unambiguously disclosing the intention for the claimed invention to serve as an alternative to magnetic disks and CDs, the specification has expressly, implicitly, or inherently supported the claimed invention's *storage capacity* to be at least comparable to that of a magnetic disk or CD.

B. Prior Art - Anticipation

1. U.S. Patent No. 6,038,320 (hereinafter "*Miller*")

The Examiner rejects claims 22 – 24 and 26 – 28 under 35 U.S.C. § 102 as being anticipated by *Miller*. Applicants respectfully submit that *Miller* does not disclose each and every element of the claimed invention.

Miller describes a security key that does not have the capability or capacity to serve as a mass-storage device, such as a "*magnetic disk or CD*." The pending claims recite a unitary portable data storage device having, among other elements, "[a] *memory being non-removable from the unitary portable data storage device and having sufficient capacity to enable the unitary portable data storage device to serve as an alternative to a magnetic disk or CD*" as well as "[a] *memory controller being coupled between the interface and the memory to control the flow of data between the memory and the USB plug in a manner to enable the unitary portable data storage device to operate as an alternative to a magnetic disk or CD*." Here in the pending claims, the recited limitations: (1) the memory "*having sufficient capacity to enable the unitary portable data storage device to serve as an alternative to a magnetic disk or CD*" and (2) the memory controller "*to control the flow of data between the memory and the USB plug in a manner to enable the unitary portable data storage device to operate as an alternative to a magnetic disk or CD*" are structural

limitations because they describe physical characteristics of the claimed device: the capability to manage the flow of large amounts of data and the sufficient memory capacity to serve as a mass-storage device such as a magnetic disk or CD.⁴ Applicants submit that these structural limitations are not anticipated by *Miller*, which as a security key device does not have the capability or capacity to serve as a mass-storage device, such as a “*magnetic disk or CD*.”

Furthermore, *Miller* cannot send back the “user’s data” in its original condition received and stored into the device by the user like the present invention. The *Miller* device can only send back the *encrypted* password. To “*operate as an alternative to a magnetic disk or CD*,” the device in the present invention must be capable of sending back the “user’s data” in its original condition received and stored into the device by the user, as such capability is fundamental to any conventional mass-storage memories such as a “*magnetic disk or CD*,” to which the unitary portable data storage device in the present invention “*operate[s] as an alternative*.” A skilled artisan would understand that the *Miller* device’s inability to send back the “user’s data” in its original condition received and stored into the device by the user is inconsistent with what is required in a mass-storage device.

In addition, *Miller* fails to disclose a memory controller coupled to the memory capable of controlling data flow to and from the memory. The disclosure in *Miller* cited by the Examiner does not teach a memory controller, but rather a USB controller. See Fig. 3, part 42; col. 2 line 64 – col. 3 line 2. To the extent that *Miller* teaches a controller, such controller is not capable of performing the function of controlling a mass storage device as required in the claimed invention. *Miller* is designed to restrict access to a host computer,

⁴ Applicants respectfully note that functional terms serve as structural limitations when they are used as adjectives to define the physical characteristics of the device. See *United States Filter Corp. v. Glegg Water Conditioning, Inc.*, 2005 WL 80947, *1 (D. Mass.); *In re Garnero*, 412 F.2d 276 (CCPA 1969). See also *Vanguard Products Corp. v. Parker Hannifan Corp.*, 234 F.3d 1370, 1372 (Fed. Cir. 2000); *Hazani v. U.S. Int’l Trade Comm’n*, 126 F.3d 1473, 1477 (Fed. Cir. 1997).

which is not operational without an externally-connected computer key, and to store only a unique key code and an encrypted password, both of which are of limited size (e.g., *Miller* suggests that the password can be six bytes, *see* col. 3, lines 42-43). To one skilled in the art, the *Miller* device does not have capability or capacity to serve as a mass storage device. The controller in the *Miller* device is incapable of meeting the demands required of a mass storage device, and therefore *Miller* fails to disclose the memory controller in the present invention.

For at least the foregoing reasons, *Miller* does not anticipate claims 22 – 24 and 26 – 28 of the present application. Thus, Applicants respectfully submit that claims 22 – 24 and 26 – 28 are patentable over *Miller* under 35 U.S.C. § 102.

2. U.S. Patent No. 6,457,099 (hereinafter “*Gilbert*”)

The Examiner also rejects claims 22 – 24 and 26 – 28 under 35 U.S.C. § 102 as being anticipated by *Gilbert*. Applicants respectfully disagree. Applicants respectfully submit that *Gilbert* does not disclose each and every element of the claimed invention.

Gilbert describes a Programmable Dedicated Application Card (PDAC) that requires the preferred embodiment described in Column 3, lines 16-19 and in Figure 1, to realize all of the described capabilities. In this embodiment, the PDAC is connected to the computer’s main internal bus and therefore has access to and intimate knowledge of the inner workings of the computer. Hence, no USB plug is disclosed in this internal embodiment.

When using the alternative embodiment as described in Column 7, lines 12-16, however, the PDAC is external to the computer and therefore does not have the ability to access the inner workings of the computer. This alternative embodiment describes a peripheral computer connected through standard serial or network methods and running independent software. *Gilbert* only casually mentions USB in this alternative embodiment, and there is nothing to imply the use of an integrated USB plug to allow direct connection to the host computer. Unlike Applicants’ specification, *Gilbert* never discloses, teaches or even

suggests a “USB plug” as part of the device throughout the *Gilbert* specification and/or claims.

The Examiner states that *Gilbert* discloses a USB plug by indicating that “a user can simply plug the external PDAC [100] into any host computer.” See 2-3-2006 Office Action, p. 15. Applicants respectfully disagree and submit that all *Gilbert* has disclosed here is that the external version of the PDAC 100 can plug into a host computer via some “plugging” action (i.e., “plug” is used only as a verb in *Gilbert*). Unlike Applicants’ specification, in which both a USB plug (i.e., “plug” as a noun) as part of Applicants’ device and the “plugging” action (i.e., “plug” as a verb) of such USB plug are disclosed, nowhere in *Gilbert* is disclosed that such “plugging” action involves particularly any USB plug as part of the *Gilbert* device. In addition, the FIG. 1 of *Gilbert*, illustrating PDAC 100, shows no USB plug, which is further evidence that no USB plug has been disclosed in *Gilbert* as part of the *Gilbert* device. As a result, under the USB Specification, one skilled artisan can only understand that the *Gilbert* device includes a USB type-B socket, which requires a USB cable with a type-B plug at one end and a type-A plug at the other in order to “plug into” a host computer.

As a result, Applicants respectfully submit that *Gilbert* does not teach or disclose a USB plug integrated into a unitary device or a storage device as claimed in the present application and that such argument is not an implicit or any other sort of admission that the specification fails to support the claimed invention.⁵

⁵ The Examiner suggests that *Gilbert* (U.S. Patent No. 6,457,099), lines 12-16 & 22-26 in col. 7, discloses as much information on the integrated USB plug in question as Applicants do. Applicants respectfully disagree because what *Gilbert* discloses there, *inter alia*, is merely an external device that may plug into a host computer via a USB. Unlike Applicants, *Gilbert* never discloses a USB plug as part of the device or a Philips D12 component that a skilled artisan would expect to be integrated with the USB plug on the same PCB (Applicants’ Figure 1) (see paragraph 22 on pp. 10-11 of *Hyde Affidavit*). These disclosures by Applicants with the rest of Applicants’ specification as a whole clearly and reasonably convey to a skilled artisan that Applicants at the time of the application were in possession of a unitary storage device with an integrated USB plug.

In addition, Applicants respectfully submit that *Gilbert* does not teach a portable storage device capable of serving as an alternative to a magnetic disk or CD like the present invention. The reason is that, as opposed to a mass-storage device such as a “magnetic disk or CD,” what *Gilbert* really teaches is a PDAC that executes dedicated software application(s) *pre-stored in the PDAC before shipping* and sends only the *results of running the software* to a user via a host computer to which the PDAC is coupled. See, e.g., lines 45-62 in col. 1. *Gilbert* teaches that a dedicated RISC processor in the PDAC running software improves execution speed. *Gilbert* also teaches that, by running the software on the PDAC instead of on the host computer, resources of the host computer are freed up for other tasks, thereby improving the host’s performance. See, e.g., line 63 in col. 1 to line 7 in col. 2. *Gilbert* states that a PDAC is its own stand-alone computer system (as opposed to a mass-storage device that is only *part* of a complete computer system), and the use of a PDAC functions as a hardware accelerator and enhances the capabilities of the host computer system. See, e.g., lines 33-36 in col. 2; lines 21-26 in col. 3. As a result, by disclosing a PDAC as a hardware accelerator, *Gilbert* does not teach a portable storage device capable of serving as an alternative to a magnetic disk or CD as the present invention.

For at least the foregoing reasons, Applicants respectfully submit that the new claims 22 – 24 and 26 – 28 are patentable over *Gilbert* under 35 U.S.C. § 102(3).

C. Prior Art - Obviousness

For the reasons discussed above, Applicants respectfully submit that neither *Miller* nor *Gilbert* anticipates the claimed invention. Also, Applicants respectfully submit that neither of them alone or in combination renders the claimed invention obvious. *Miller* is a security device that functions like an electronic key. To a skilled artisan, an electronic key is not similar to a mass-storage device. A skilled artisan will have no reason to increase the *Miller* device’s memory capacity to the level of a mass-storage device capable of serving as

an alternative to a magnetic disk or CD because the size of the stored key code or encrypted password is so tiny (*e.g.*, *Miller* suggests that the password can be six bytes, *see* lines 42-43 in col. 3; such is far below the capacity of a magnetic disk of 1.44 MB, or 1,440,000 bytes).

In addition, Applicants respectfully submit that *Miller* actually teaches away from having a high-capacity memory or controller due to efficiency commonly sought by any skilled artisan in designing any kind of device. Because of the tiny memory capacity needed, a high-capacity memory or controller capable of serving as an alternative to a magnetic disk or CD is not only unnecessary but also extremely wasteful and inefficient. In other words, to a skilled artisan, the *Miller* device should never have the capability or capacity to serve as a mass-storage device.

Furthermore, as discussed above, the fundamental functionality of a mass-storage device capable of serving as an alternative to a magnetic disk or CD is to send back the “user’s data” in its original condition. The *Miller* device can never send back to the host computer the user-selected password in its original condition. Only the encrypted password can be sent back. In fact, because of its secrecy, the user-selected password should never be sent back to the host computer in its original condition. In other words, *Miller* actually teaches away from sending back the “user’s data” in its original condition, the functionality fundamental to a mass-storage device. That is, to a skilled artisan, the *Miller* device should never function like a mass-storage device that can send back the original “user’s data.” As a result, because of all the reasons stated above, the *Miller* device does *not* render the present invention obvious to a skilled artisan.

Applicants respectfully submit that *Gilbert*, on the other hand, is a PDAC functioning like a programmable hardware accelerator. To a skilled artisan, a PDAC or a programmable hardware accelerator is not similar to a mass-storage device. A skilled artisan will have no reason to use a PDAC or a hardware accelerator as a mass-storage device capable of serving

as an alternative to a magnetic disk or CD because the functionality of a PDAC or a hardware accelerator is very different from that of a mass-storage device capable of serving as an alternative to a magnetic disk or CD.

In addition, Applicants submit that *Gilbert* actually teaches away from functioning like a mass-storage device. The fundamental functionality of a mass-storage device capable of serving as an alternative to a magnetic disk or CD is to send back the “user’s data” stored by a user. The *Gilbert* device neither stores the “user’s data” into its non-volatile memory nor sends back to the host computer the “user’s data.” Instead, only the results of running the software stored on the *Gilbert* device are sent back. In other words, *Gilbert* actually teaches away from sending back the “user’s data,” the functionality fundamental to a mass-storage device. As a result, because of all the reasons stated above, the *Gilbert* device does **not** render the present invention obvious to a skilled artisan.

Claim 25 stands rejected under 35 U.S.C. § 103 as being unpatentable for obviousness over *Miller* in view of *Kondo*. Claim 25 depends from claim 22 and incorporates all of its limitations. As described above, *Miller* does not describe, teach, or suggest all limitation of Claim 22. *Kondo* does not cure the deficiencies of *Miller*. Therefore Claim 25 is patentable over *Miller* in view of *Kondo*.

Claim 29 stands rejected under 35 U.S.C. 103(a) as being unpatentable over *Margalit et al.* (U.S. Patent No. 6,748,451, hereinafter “*Margalit*”) in view of *Jha et al.* (U.S. Patent No. 6,407,949, hereinafter “*Jha*”). Claim 29 is dependent on claim 22 and is therefore allowable for all reasons set forth above. Moreover, Applicants respectfully submit that *Margalit* discloses a security device that does not have the capability of serving as an

alternative to a magnetic disk or CD.⁶ *Margalit* clearly states that the device is “analogous to a memory smart card.” Col. 4, lines 21-22. The amount of information on a memory smart card is very small (up to only 1 KB, as opposed to a magnetic disk’s 1.44 MB, or 1,440 KB) because of such memory smart card’s very limited storage capacity at the time of the claimed invention. See paragraph 21 on p. 10 of *Hyde Affidavit*. This is entirely consistent with *Margalit*’s disclosure that its design can only hold a small amount of information, *i.e.*, “information characterizing a mobile user” See lines 27-32 in col. 6 of *Margalit*. “Such information may comprise user identify authentication information, banking information, access rights information, etc.” See *id.* Hence, “analogous to a memory smart card,” the *Margalit* device disclosed in its Figure 1 is designed to handle data of such very small amount. See lines 20-23 in col. 4 of *Margalit*. Since the amount of data stored is so small, there is no requirement to move this data into and out of the device at high performance. See paragraph 21 on p. 10 of *Hyde Affidavit*. In fact, *Margalit* teaches a CY7C63001A component, a low speed (1.5 Megabits per second) USB interface component, to be used in its “key” device, clearly indicating such slow data rate. See paragraph 22 on pp. 10-11 of *Hyde Affidavit*; see also Figures 3 and 4 of *Margalit*. As a result, a skilled artisan would understand that the CY7C63001A component taught in *Margalit* to handle only a small amount of slow data was not designed to operate in a mass-storage device serving as an alternative to a magnetic disk or CD, as claimed in Applicants’ application. See paragraphs 20-21 on p. 10 of *Hyde Affidavit*. Likewise, a skilled artisan would understand that the memory capacity employed to store such small amount of data in *Margalit* does not anticipate or render obvious claims directed to a memory having sufficient capacity to serve

⁶ *Margalit* describes that the PC treats the device as a specialist device and does *not* recognize it, or treat it, as mass-storage device like a magnetic disk or CD, as claimed in Applicants’ application. See, *e.g.*, line 5, col. 7 to line 61, col. 9 in *Margalit*.

as an alternative to a magnetic disk or CD. *See id.* Hence, the *Margalit* “key” device contains neither a USB component having the capability nor a memory having the capacity to enable its device to operate as a mass-storage device like a magnetic disk or CD, as claimed in Applicants’ application. In addition, *Margalit*’s small memory would be wholly inconsistent with the division of such already very small memory into a plurality of zones, as disclosed in *Jha*. Hence, there would be no motivation for a skilled artisan to combine *Margalit* and *Jha* to create multiple zones in the memory.

Claim 30 is dependent from dependent Claim 29 and independent Claim 22 and incorporates all limitations of these claims. Therefore, Claim 30 is patentable over *Margalit* in view of *Jha* at least for the same reasons stated above for Claim 29.

D. Firsthand Practical Knowledge of Unsolved Needs and Commercial Success Combined with Copying by Others Show Non-Obviousness.

Applicants submit that they have clearly demonstrated that the claimed invention is not anticipated by any prior art. It is therefore appropriate to submit evidence of secondary considerations of non-obviousness to further support the patentability of the claimed invention. In addition that neither *Miller* nor *Gilbert* alone or in combination renders the claimed invention obvious as discussed above, additional evidence of *secondary considerations* (including an expert’s firsthand practical knowledge of unsolved needs at the time of the claimed invention and Applicants’ commercial success of the claimed invention combined with copying by others)⁷ clearly shows non-obviousness of the present invention. Applicants respectfully attach the Affidavit of John Hyde, an expert in the field of Universal

⁷ The Court held in *Cable Elec. Prods., Inc. v. Genmark, Inc.*, 770 F.2d 1015 (Fed. Cir. 1985), that such evidence should always be considered.

Serial Bus (USB) and USB based devices. This Affidavit presents the evidence of *secondary considerations* and must be considered in its entirety.

The Federal Circuit held that “[f]irsthand practical knowledge of unsolved needs in the art, by an expert, is evidence of the state of the art.” See *In re Piasecki*, 745 F.2d 1468, 789 (Fed. Cir. 1984) (citing *In re McKenna*, 203 F.2d 717 (C.C.P.A. 1953)). At the time of the present invention, “[t]he long-felt needs for greater capacity storage devices (especially for music and graphic files), however, led to the development and introduction of alternative storage devices.” See para. 13 on pp. 5-6 of *Hyde Affidavit*. “Many touted alternatives, such as IBM’s 2.88MB floppy disk, Iomega’s ZIP and Jaz Drives, Imation’s SuperDisk, Sony’s HiFD Drive, and Rewritable Compact Discs, comprise a two-part system, namely a drive (*i.e.*, the mechanism for reading and writing data from and to the storage media) and the storage media itself (usually a magnetic disk or CD). This was the approach utilized by the incumbent ‘drive and media’ systems.” See *id.* “For various reasons, none of these touted replacements truly lived up to expectations or replaced the floppy disk as the universal medium for storage.” See para. 15 on p. 7 of *Hyde Affidavit*. Clearly, the expert Hyde’s firsthand knowledge of unsolved needs in the art at the time of the present invention is evidence of the state of the art back then. In other words, the long-felt needs and failure by others at the time of the invention combined with the fact that the claimed invention fulfilled such long-felt needs strongly indicate the non-obviousness of Applicants’ present invention. See pp. 5-7 and para. 24 on p. 11 of *Hyde Affidavit*.

The Federal Circuit Court has also held that a combination of commercial success and copying by the infringer may provide strong evidence of non-obviousness. See *Heidelberg Harris, Inc. v. Mitsubishi Heavy Industries, Ltd.*, Civ. App. No. 99-1100 (Fed. Cir. Sept. 18, 2000) (unpublished). Applicants’ company, Trek, manufactures and sells the present invention under the trademark “ThumbDrive.” Ever since the launch of the claimed

invention (ThumbDrive) in March 2000, the never-before-seen products have enjoyed numerous praises from industrial commentators and tremendous commercial success because of the claimed invention's features. *See Hyde Affidavit* pp. 5 and 11-15; *see also Hyde Affidavit* pp. 11-15 for examples of the praises from industrial commentators.

"Because of all of its features, the claimed invention has been a commercial success ever since it was launched in February 2000, at CeBit 2000, which is the foremost computer and IT fair in the world. . . . [S]ince the launch, over 450,000 units of the claimed invention's various versions, *e.g.*, 'ThumbDrive Smart,' 'ThumbDrive Secure,' and the latest, the 'ThumbDrive Touch,' were sold around the world, with sales averaging 12 million Singapore dollars from 2000 to 2003 (approximately 6.8 million U.S. dollars based upon the average exchange rate from 2000 to 2003)." *Hyde Affidavit* p 5. "Apart from the CeBit and COMDEX shows in 2000, [Applicants' company] Trek also exhibited the claimed invention at the Computex show in Taiwan." *Hyde Affidavit* p. 14. In October 2001, Applicants' company Trek was selected by IBM to manufacture essentially the "ThumbDrive" products for IBM, which were to be sold as "IBM Memory Key." *See id.* A similar deal was entered into with Sonnet Technologies in December 2001. *See id.*

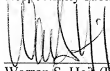
"Since the launch, the claimed invention (ThumbDrive) has become close to being regarded by the industry as the true replacement for the floppy drive. This is not surprising as the claimed invention offered all of the advantages of the floppy disk (universality, compactness, affordable storage capacity, *etc.*) but with the advantage of having significantly larger storage capacities than the floppy disk, promise of even greater storage capacities in the future, but at a miniscule fraction of the size. For example, a single 128MB version has the equivalent capacity of about 88 pieces of 3.5-inch floppy disks." *Id.*; *see also Hyde Affidavit* pp. 14-15 for some other examples of praises from industrial commentators after the launch of the claimed invention.

After Applicants' company Trek introduced the claimed invention into the market, other companies have copied the claimed invention. *See Hyde Affidavit* pp. 16-17 for a non-exhaustive list of such companies and their copying products (which are ever increasing). As held by the Federal Circuit, a combination of commercial success and copying by the infringer may provide strong evidence of non-obviousness. The praises by industrial commentators clearly show the commercial success enjoyed by the claimed invention (ThumbDrive) resulted from its features claimed in the present application. This commercial success combined with copying by others clearly shows that the present invention is not obvious to a skilled artisan. *See Heidelberg*, Civ. App. No. 99-1100 (Fed. Cir. Sept. 18, 2000) (unpublished).

CONCLUSION

Applicants respectfully submit that claims 22 – 30 are fully supported by the specification as filed and are patentable over the cited art of record. As such, early notification of allowance of claims 22 – 30 is earnestly requested.

Respectfully submitted,



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Dated: April 18, 2007

APPENDIX A: CLAIMS APPENDIX

22. A unitary portable data storage device which can be directly plugged into a universal serial bus (USB) socket of a computer and which is operative to function as an alternative to a magnetic disk or compact disk (CD), and which is capable of storing software for installation to the computer or of receiving and storing user's data present in the computer, the unitary portable data storage device comprising:

a USB plug integrated into the unitary portable data storage device without an intervening cable capable of coupling the unitary portable data storage device directly to a USB socket on a computer;

a single interface, said interface allowing the unitary portable data storage device to communicate via the USB protocol and being coupled to the USB plug;

a non-volatile solid-state memory, said memory being non-removable from the unitary portable data storage device and having sufficient capacity to enable the unitary portable data storage device to serve as an alternative to a magnetic disk or CD; and

a memory controller, the memory controller being coupled between the interface and the memory to control the flow of data between the memory and the USB plug in a manner to enable the unitary portable data storage device to serve as an alternative to a magnetic disk or CD.

23. A unitary portable data storage device according to claim 22, wherein the memory controller is non-removable from the unitary portable data storage device.

24. A unitary portable data storage device according to claim 22, wherein the non-volatile solid-state memory is a flash memory.

25. A unitary portable data storage device according to claim 22, further comprising a manually operated switch movable between a first position in which writing of data to the memory is enabled, and a second position in which writing of data to the memory is prevented.

26. A unitary portable data storage device according to claim 22, wherein the memory controller comprises a micro-controller.

27. A unitary portable data storage device according to claim 26, wherein the micro-controller includes a read-only memory which stores a program to control the operation of the micro-controller.

28. A unitary portable data storage device according to claim 22, wherein the unitary portable data storage device is sufficiently compact to maximize portability.

29. A unitary portable data storage device according to claim 22, wherein the non-volatile solid-state memory is divided into a plurality of zones.

30. A unitary portable data storage device according to claim 29, wherein one or more of said plurality of zones require a unique password for access.

APPENDIX B: EVIDENCE APPENDIX

- 1. Affidavit of John Hyde under 37 CFR 1.132**



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 09/803,173 Confirmation No.: 9334
Applicants : Chong Seng Cheng
Teng Pin Poo
Filed : March 9, 2001
TC/A.U. : 2186
Examiner : Choi, Woo H.

Docket No. : 1601457-0004
Customer No. : 007470

AFFIDAVIT OF JOHN HYDE UNDER 37 CFR § 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

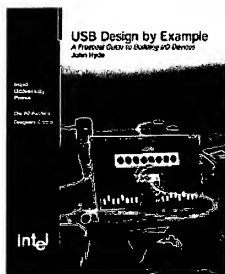
I, John Hyde, of 4545 NW 147th Ave, Portland, OR, 97229, do solemnly and sincerely affirm and say as follows:

I. I obtained a Bachelor of Science degree in Electronics in 1974 from University of Southampton in England. I worked for Intel Corporation for 25 years before leaving in February 2002 to create my own USB Consultancy Business. I am an IEEE Certified Electronics Engineer and have worked in almost every department within Intel. I have held a number of positions during my tenure at Intel, including the Pentium Pro Technical Marketing Manager where I oversaw a staff of 11 people, and Staff Engineer in Intel's Desktop Systems Group where I was responsible for driving industry adoption of a new peripheral expansion bus for the desktop PC now known as the Universal Serial Bus, or USB.

2. I understand and have designed complex-logic, digital, integrated circuits, circuit boards that use these integrated circuits, computer systems that use these circuit boards and systems and applications software that make these systems operate. I am the author of several patents. I am knowledgeable at all levels of a system solution. As a result, Intel often tasked me with resolving many systems integration issues. Intel also decided to “bottle my knowledge” by having me write textbooks.

3. During my tenure at Intel, I had an opportunity to become an expert in USB technology. In 1987, I was responsible for the joint Intel/Microsoft publication “PC98 Hardware Design Guide.” Of interest to this case are the sections concerning the expansion of the PC’s capabilities, where the direction was basically “Serial and Parallel OUT, USB IN.”

4. In 1999, I authored what is considered to be one of the leading treatises in USB device development technology titled “USB Design By Example” (See below).



5. My book has been reviewed as follows: "*USB Design by Example* explains what USB means to hardware developers, taking an approach that combines academic elucidation of the official specification with some experimental setups. . . . John Hyde's explanations represent a valuable supplement to the notably obtuse specification documents. This book does a good job of explaining USB input/output from both the hardware and software perspectives. . . ." Amazon.com.

6. In 2000 I created a major revision of this book called "Second Edition" to cover the advances in USB technology and its applications.

7. More recently I have written a book titled "Multi-role USB Device Design By Example" for Cypress Semiconductor. I currently run a USB Design Consultancy Business and many of the USB products that I have developed for clients are available in stores today.

8. Unless otherwise stated, the matters deposed to herein are within my knowledge or derived from the files and documents to which I have access. Insofar as the matters deposed to herein are within my personal knowledge, they are true and insofar as they are not within my personal knowledge, they are true to the best of my information and belief.

9. I am retained as a consultant to assist in the prosecution of the present patent application by providing a discussion on how the features of the claimed invention resulted in its commercial success based on my expertise and knowledge in the subject matter.

10. I am advised that claim 22 of the present application recites as follows:

A unitary portable data storage device which can be directly plugged into a universal serial bus (USB) socket of a computer and which is operative to function as an alternative to a magnetic disk or CD, and which is capable of storing software for installation to the computer or of receiving and storing user's data present in the computer, the unitary portable data storage device comprising:

a USB plug integrated into the unitary portable data storage device without an intervening cable capable of coupling the unitary portable data storage device directly to a USB socket on a computer;

a single interface, said interface allowing the unitary portable data storage device to communicate via the USB protocol and being coupled to the USB plug;

a non-volatile solid-state memory, said memory being non-removable from the unitary portable data storage device and having sufficient capacity to enable the unitary portable data storage device to serve as an alternative to a magnetic disk or CD; and

a memory controller, the memory controller being coupled between the interface and the memory to control the flow of data between the memory and the USB plug in a manner to enable the unitary portable data storage device to operate as an alternative to a magnetic disk or CD.

11. Trek is the company that manufactures and sells the claimed invention recited above under the trademark "ThumbDrive." The claimed invention is a unitary portable data storage device with an integrated universal serial bus (USB) plug that can be directly plugged into a USB socket of a computer without an intervening cable and functions as an alternative to a magnetic disk or CD, capable of storing software for installation to the computer or of receiving and storing user's data present in the computer. It is also of the one-piece, unitary construction in which all parts are integrated and non-removable. It comprises an integrated USB plug, a USB interface, a non-removable memory with sufficient capacity like a magnetic disk or CD, and a memory controller that controls the data flow so that the claimed invention



may function like a magnetic disk or CD. The claimed invention (ThumbDrive) was designed to be a replacement to the 3.5 inch floppy disc format and CD ROMs. As will be explained more fully below, it is a self-contained drive and media package that is no bigger than the size of a human thumb. The device plugs directly into the USB port of any computer without any intervening cable and can store and retrieve virtually any digital data from documents, presentations, to music and photos. The popular Windows 2000, ME and XP and Apple's Macintosh operating systems are all supported.

12. Because of all of its features, the claimed invention has been a commercial success ever since it was launched in February 2000, at CeBit 2000, which is the foremost computer and IT fair in the world. I am advised that, since the launch, over 450,000 units of the claimed invention's various versions, e.g., "ThumbDrive Smart," "ThumbDrive Secure," and the latest, the "ThumbDrive Touch," were sold around the world, with sales averaging 12 million Singapore dollars from 2000 to 2003 (approximately 6.8 million U.S. dollars based upon the average exchange rate from 2000 to 2003).

13. To explain why the claimed invention has been commercially successful, I first need to provide some historical background of the claimed invention. Following is a brief examination of what data storage solutions were available in the market before February 2000. The most common form of portable data storage was the ubiquitous floppy disk. This form of storage had been first introduced in the early 1970s and gradually evolved into the 5.25 inch, and later, the current 3.5-inch version (with a maximum capacity of



5.25" Floppy Disk



3.5" Floppy Disk

1.44 megabytes). This 3.5-inch version became the universal standard medium for data storage. The long-felt needs for greater capacity storage devices (especially for music and graphic files), however, led to the development and introduction of alternative storage devices. Many touted alternatives, such as IBM's 2.88MB floppy disk, Iomega's ZIP and Jaz Drives, Imation's SuperDisk, Sony's HiFD Drive, and Rewritable Compact Discs, comprise a two-part system, namely a drive (*i.e.*, the mechanism for reading and writing data from and to the storage media) and the storage media itself (usually a magnetic disk or CD). This was the approach utilized by the incumbent "drive and media" systems.

14. Note that all of these devices follow the same implementation model where data is stored on portable media that is inserted into a protective slot that contained the media reader/writer. This protective slot was built into the personal computer itself (*e.g.*, floppy disk slot of a desktop PC or the



Iomega's Zip Drive



Imation's LS120 Drive



Sony's HiFD Drive



CR-RW Drives

PCMCIA slot of a mobile PC) or it was built into a peripheral device (e.g., an external floppy disk unit or a ZIP drive) that was connected to the personal computer via a cable. The external devices typically had their own power supply due to the current needed for motors to spin the rotating media.

15. For various reasons, none of these touted replacements truly lived up to expectations or replaced the floppy disk as the universal medium for storage.

16. Hence, Trek recognized that there was an unexploited (and potentially huge) market for a new storage device that could replace the floppy disk and still meet or exceed the qualities that made the floppy disk so popular and ubiquitous:

- Universality

The claimed invention is capable of being used on most, if not all, personal computers, regardless of the operating system and without the need for other peripherals. This arises out of the use of an integrated USB plug to connect directly into any open USB socket available on most computers without needing any cable. The use of the USB standard also results in the claimed invention's hot-swappability that brings tremendous convenience in combination of the compact,

integrated design discussed below. The same could not be said for many of the other devices, such as the ZIP Drive or the CD-R/W drive.

▪ Compactness

The claimed invention is a completely unitary and fully integrated structure with no removable parts. Such construction resulted in its lightweight and small, convenient "form factor" no larger than an adult's thumb. Actually, the compactness had been a significant factor that made the floppy disk popular and has been the key factor that made the claimed invention popular. Furthermore, because of the hot-swappability from the adoption of the USB standard, the compact and integrated "form-factor" offers great convenience in the claimed invention's operations. In contrast, many of the other storage devices were large, heavy, and cumbersome and often needed a separate power source.

▪ Large Storage Capacity at Lower Cost

Like and even better than a floppy disk, the claimed invention provides large storage capacity without the need for an attendant driver or reader mechanism. As a result, the claimed invention is achieving significant mass-market acceptance. In contrast, the other alternatives, notably CD-R/W and ZIP drives, were and remain comparatively expensive because of the needs of their separate expensive readers.

17. In my opinion, the claimed invention created a paradigm shift in portable computer memory. It created a third method of connecting a storage device to a personal computer: the industry previously had the two methods discussed earlier, *i.e.*, portable media that fit into a protective slot containing a media reader/writer or a cable-connected, independent, peripheral device typically with its own power source. This new third method was an integrated

media+reader/writer device that could be casually appended to a personal computer. There was no need for a specialized, protective slot containing a media reader/writer device since the device integrated its own media reader/writer device and plugged directly into a standard USB socket. The new thinking was in designing a device of unitary construction with all parts integrated and non-removable, specifically one that would require no additional reader/writer and has an integrated Universal Serial Bus ("USB") plug directly connectable to the computer without a cable and non-removable memory with large capacity like a magnetic disk or CD. I note that an intervening cable between a USB plug and a USB socket (as an extension cable) was not permitted under the USB Specification at the time of the claimed invention. Hence, one skilled in the art would understand that the USB plug of the claimed invention would be capable of being directly plugged into a USB socket on a PC without any intervening cable.

18. The integration of the all the reader/writer and storage parts into one unitary and compact package resulted in a device that was more convenient and portable than the other mass storage devices. The user no longer had to carry separate cables, adaptors, or memory medias (such as magnetic disks or CDs) to use the claimed invention. They were also assured that they could access the data on the device on almost all computers.

19. The need for the unitary integration drove Trek to employ flash memory as the storage media. Flash memory chips not only enabled a small form factor to be achieved but also resulted in a more robust storage media than say, magnetic disks or CDs. No separate reader/writer also meant that no need for substantial current to be drawn through the USB port. The claimed invention works with the 500 mA (milliamperes) and 5 volts offered by the USB port. At the time, the current offered by a USB port would generally

have been insufficient for some other storage devices such as rotating media due to the drive motors.

20. Also, to achieve the total unitary integration, the memory controller for the device would have to be built into the claimed invention. A memory controller controls the flow of data between the host computer and the claimed invention. Trek would need a memory controller having the capability to control the flow of data so that the claimed invention could operate like a magnetic disk or CD.

21. Serial interface flash components, such as those found in Smart Cards or those used for saving configuration data, would be too slow and too small to be used in the claimed invention (at the material time the upper storage limit for these components was 1 KiloByte). A Smart Card has a serial interface and is thus an inherently slow device when compared with other data storage devices. In addition, since the amount of data stored on a Smart Card is so small, there is no requirement to move this data into and out of the device at high performance.

22. Trek also needed a USB controller because of the adoption of the USB standard for the claimed invention. At the material time USB supported two speeds: low at 1.5Mb/s and full at 12Mb/s. The performance requirement discussed in the previous section would dictate the use of a full speed USB controller instead of a low speed one. As a result, Trek chose to use a Philips D12 (PD\USB D12) component (operating at the full-speed 12Mb/s) as the USB interface controller in the claimed invention rather than the then popular low-speed Cypress Semiconductor CY7C63001A component. A person skilled in electronics or electrical art at the material time would understand that the Philips D12 component was designed to be used on a printed circuit board (PCB) in close proximity to a USB connector.

Launch of Claimed Invention (ThumbDrive)

23. I am advised that, after months of discussions and research work, the claimed invention was finally launched at CeBit 2000 in Hanover, Germany in March 2000, under the name “**ThumbDrive**” and subsequently at COMDEX SPRING 2000 in Chicago, PC EXPO in New York, and COMPUTEX fair in Taiwan. There was no other company that exhibited any device that resembled the claimed invention (ThumbDrive).

24. The claimed invention became a success because of the claimed invention’s universality, compactness, and low-cost storage capacity discussed above. There was, simply put, nothing like it in the storage market. Some industry comments, which demonstrate that the claimed invention succeeded in achieving what it had set out to accomplish, *i.e.*, to fulfill the long-felt needs for a greater capacity storage device that is universal, compact, and with high capacity as discussed earlier, are reproduced below:

- *“The most impressive bit of hardware technology at COMDEX was also the smallest. It’s called the ThumbDrive, from Trek 2000 International Ltd. (www.thumbdrive.com). The idea for this device is so clever and handy that I’m surprised that nobody else has thought of it before...Once you’ve stuck the ThumbDrive into a USB port, what have you got? You’ve got an ultra high speed ‘disk drive’ holding from 8MB to 256MB of data..., in a finger sized device that is practically indestructible.”* [from The Chicago Computer Guide]

- *"If you want handy, portable storage, you might want to try out Trek's ThumbDrive."* [from Computer Times, 22 March 2000]
- *"[T]he Trek ThumbDrive is actually an attractive alternative to all those monosyllabic, mobile megabyte machines: Zip, Jaz, Klik! and Orb."* [from www.reviewsonline.com, 20 April 2000]
- *"The ThumbDrive is certainly a pretty innovative and nifty product."* [from www.hardwarezone.com]
- *"In the search for a new way to store data, Trek 2000 International has created the Trek Thumbdrive...the best part of the Thumbdrive is that 'no software, no connection wire and no battery are required.'" [from www.edgereview.com, 29 June 2000]*
- *"Meanwhile, Trek, a virtually unknown company from Singapore, has created an amazing little 'hard drive' that plugs directly into any USB port...Also unlike Smart Media, Compact Flash, and other forms of solid-state removable media that requires some sort of adapter, the ThumbDrive requires only an open USB port. This universality will take this drive a long way. That the drive is bus powered (powered by computer) makes this an even more intriguing product...it reminds us of a gadget out of a spy thriller."* [from www.techtv.com, 14 July 2000]
- *"The ThumbDrive takes an innovative approach to using the USB port by plugging directly into it. No connection cable is necessary."* [from www.mistupid.com]

- *"The ThumbDrive is billed as the world's smallest storage device, and this tiny unit will give you quick and easy access to your data when you're on the move . . . No additional adapters, power, batteries, cables or card readers are required."* [from PC Magazine, Feb 2001 issue]

- *"In this new age of technology products are getting smaller, smarter and more convenient for end users. Technology has become part of our everyday lifestyle. Such things as cell phones, PDA's, and laptops are all designed with ease of portability in mind. They are made light, small and designed to go wherever you go. There is a new trend in town and that is being able to carry amounts of data around with you to be able to access elsewhere. The leading product in this trend is the Thumbdrive. Trek USA is one of the leading companies to offer products of this new trend. Their Thumbdrive products offer great portability with its thumb size design and ease of use. With its USB interface data can be transferred quickly and simply without having to load any drivers (except for Windows 98 and 98SE) which makes this product stand above the competition."* [from www.techwarelabs.com, 12 June 2002]

Copies of these reviews have been exhibited at "JH-1," which also includes a list of the awards garnered by the claimed invention (ThumbDrive) as well as stories of companies that have adopted the claimed invention into their essential business operations.

Commercial Success

25. I am advised that, soon after the launch, Trek started on promoting and marketing the claimed invention around the world. Apart from the CeBit and COMDEX shows in 2000, Trek also exhibited the claimed invention at the Computex show in Taiwan. I am advised that the average sales of claimed invention (ThumbDrive) were in excess of 12 million Singapore dollars from 2000 to 2003 (approximately 6.8 million U.S. dollars based upon the average exchange rate from 2000 to 2003).

26. I am advised that, in October 2001, Trek was selected by IBM to manufacture what are essentially the "ThumbDrive" products for IBM, to be sold as "IBM Memory Key." A similar deal was entered into with Sonnet Technologies in December 2001.

27. Since the launch, the claimed invention has become close to being regarded by the industry as the true replacement for the floppy drive. This is not surprising as the claimed invention offered all of the advantages of the floppy disk (universality, compactness, affordable storage capacity, *etc.*) but with the advantage of having significantly larger storage capacities than the floppy disk, promise of even greater storage capacities in the future, but at a miniscule fraction of the size. For example, a single 128MB version has the equivalent capacity of about 88 pieces of 3.5-inch floppy disks.

28. That the claimed invention (ThumbDrive) was the first in the world and the only complete solution to the search for the replacement for the floppy disk is clear.

- *"The ThumbDrive is a technological breakthrough..."* [from www.storagesearch.com, February 2000]

- One article (www.techwarelabs.com) described Trek as *"...a pioneer in mobile storage solution.... In Feb 2000, Trek introduced the Thumbdrive, a portable USB-powered solid-state storage solution that brought about the beginning of the end of floppy drives."*
- A local review (IT AsiaOne, 28 June 2000) called it a *"groundbreaking product."*
- Another article (www.tcbizreview.com, May 2002) described the ThumbDrive as *"The one that started it all."*

29. It was so revolutionary that one review (ZDNet India, 2 February 2001) had this to say:

"Imagine a device that uses no batteries, no software, no cables, and no external hardware required to transfer and store data. Imagine a drive that is so small that you can carry in your pocket. Welcome aboard the 16MB Trek ThumbDrive..."






The aforementioned four articles are exhibited hereto, marked "JH-2."



30. Recently, some PC manufacturers began to sell PCs without a floppy disk drive. In February 2003, Dell Corporation, the largest PC manufacturer in the world, announced that it would treat floppy drives as an optional item. Another article, from www.bbc.com, heralded the growing popularity of what the author called "keyring drives." This further enforces the claimed invention's being a replacement for floppy disk.

I now produce and exhibit hereto, the aforesaid articles, marked "JH-3."

Copying by Others

31. After Trek introduced its claimed invention (ThumbDrive) into the market, companies around the globe have copied the claimed invention and began selling their own clones. A non-exhaustive list of such companies and their products (which are ever increasing) is as follows:

Name of company	Product Name	Pictorial representation
EZ Drive	EZ Drive	
Transcend	Pen FlashDrive	
Edge Memory	DiskGo!	
Lexar Media	JumpDrive	
TwinMos Technologies	Mobile Disk	

Name of company	Product Name	Pictorial representation
Viking Components	USB Drive	
Ritronics Components	SlimDisk Diskey	

32. Trek was granted a patent in respect of the claimed invention, namely, Singapore Patent No 87504 [WO 01/61692] ("the ThumbDrive Patent") on 16 April 2002 by the Intellectual Property Office of Singapore.

A copy of the ThumbDrive Patent is now produced and exhibited hereto, marked "JH-4."

33. I am advised that the patent has been litigated and upheld in Singapore.

A copy of the Singapore judgment is now produced and exhibited hereto, marked "JH-5."

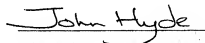
34. I am advised that the patent offices of the United Kingdom, Australia, New Zealand and South Africa, amongst others, have decided to grant patents in respect of the claimed invention, whilst other patent applications are pending in China, Japan and Europe. Trek has filed applications for a patent for the claimed invention in a total of 34 countries around the world.

Copies of patent certificates or letters confirming the grant of patents in some of these countries are now produced and collectively exhibited hereto, marked "JH-6."

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the present application or any patent issued thereon.

Respectfully submitted,

Dated: November 28, 2005


John Hyde

2. Affidavit of Yongmin Kim under 37 CFR 1.132



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 09/803,173
Applicant : Chong Seng Cheng
Filed : March 9, 2001
TC/A.U. : 2186
Examiner : Choi, Woo H.

Confirmation No.: 9334

Docket No. : 1601457-0004
Customer No. : 007470

AFFIDAVIT OF YONGMIN KIM
UNDER 37 CFR 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Yongmin Kim, Ph.D., of 4431 NE 189th Place, Seattle, WA 98155 do solemnly affirm and say as follows:

1. I, Yongmin Kim, am authorized by Trek 2000 International Ltd. ("Trek"), which is the assignee of record of the above-captioned patent application, to make this affidavit on its behalf. Unless stated otherwise, the matters discussed in this affidavit, which I believe to be true, are within my own knowledge and/or derived from the records of these proceedings to which I have ready access.
2. My credentials are set forth in my Curriculum Vitae, attached hereto as Exhibit **YK-1**. In summary, I have been teaching, working and researching in the fields of electrical engineering and computer engineering for more than 25 years. I have obtained bachelor's degree in electronics engineering from Seoul National University in Seoul, Korea in 1975, and master's and doctorate degrees in electrical engineering from the University of Wisconsin-Madison in 1979 and 1982, respectively.
3. I am currently a Professor in the Department of Electrical Engineering and Professor and Chair in the Department of Bioengineering at the University of Washington in Seattle. I am also an Adjunct Professor of Computer Science and Engineering. I have offered various lectures and courses to engineers and researchers around the world

including U.S., U.K., France, Italy, Korea, Singapore and Japan. My research interests include computer architectures, digital systems and subsystems and signal processing. I have supervised 29 Ph.D. dissertations and 101 Masters theses and am currently working with 15 Ph.D. students in addition to 2 professional research staff members. I have more than 40 patents issued and approximately 25 patents pending in the U.S. and abroad. I have transferred the invented technologies to industry with 23 licenses and helped with the commercialization of these technologies.

4. I have been a consultant to a number of governmental and commercial organizations, including U.S. government agencies, Intel, Siemens, Texas Instruments, Micron, Samsung, Hitachi, Fujitsu and Canon. I am a Fellow of the Institute of Electrical and Electronics Engineers (IEEE). I have authored or co-authored many books and have more than 370 research publications. I am on the Editorial Board of several journals, including the Proceedings of the IEEE. Among many honors, I have received the 1988 Early Career Achievement Award of the IEEE/EMBS and the 2003 Ho-Am Prize in Engineering. I am the President of the IEEE/EMBS in 2005 and 2006. In 2004, the University of Washington Board of Regents appointed me as the Hunter and Dorothy Simpson Endowed Chair.
5. I am retained by Trek as a consultant to assist in the prosecution of the present application by providing a background discussion on the technology and explaining certain aspects of the invention disclosed and claimed in the present application based on my expertise and knowledge in the subject matter. Below I briefly describe portable mass storage devices and the state of the prior art. I also identify where aspects of the invention are taught in the specification and point out the differences between the prior art and the claimed invention in the present application.

Background

6. The computer technology at issue in the present application centers on "mass storage devices." Specifically, the present application discloses a portable mass storage device that is an alternative to, and eliminates the shortcomings of, traditional mass storage devices such as magnetic disks or CD-ROMs. *See, e.g.,* page 1, line 13 to page 2, line 11; page 9, lines 5 – 9.
7. A mass storage device is a storage device having a very large storage capacity. *IEEE Standard Dictionary of Electrical and Electronics Terms*, page 630, attached hereto as

Exhibit YK-2. Mass storage devices are indispensable elements of a computer system. They allow the computer and the computer user to store and transfer between computers large amounts of data (e.g., documents, graphics, audio, pictures, video, software programs, etc.) The data may be retrieved from the mass storage for later use.

8. Each computer typically has more than one type of mass storage. Most computers today come with a hard drive. A hard drive is a permanent type of mass storage device because it is permanently contained inside the computer.
9. In addition to permanent mass storage devices such as hard drives, virtually every computer allows a user to store large amounts of data on portable mass storage devices. There are many types of portable mass storage devices – floppy disks, CD-ROMs, ZIP disks, flash memory, etc. Data stored on portable mass storage devices can be carried away from one computer and transported to another computer. In addition, data is frequently archived on portable mass storage devices to back up a computer's hard drive.
10. Each of the different types of portable memory storage devices discussed above is designed to work in conjunction with a specially designed reader or a specially designed slot into which it is inserted. This has resulted in a series of compromises of, among other things, the portability, universality, or ease of use of the devices. The portable mass storage device disclosed in the present application does not require the use of a separate drive, reader/writer or cable and does not need to be installed inside the computer. Rather, the present application teaches a self-contained mass storage device having a USB plug that directly plugged into the USB socket of a host computer. Thus, the disclosed invention avoids the disadvantages that plagued much of the prior art. *See, e.g.,* page 1, line 13 to page 2, line 11; page 9, lines 5 – 9.
11. I am advised that claim 22, as amended, recites as follows:

A unitary portable data storage device which can be directly plugged into a universal serial bus (USB) socket of a computer and which is operative to function as an alternative to a magnetic disk or CD, and which is capable of storing software for installation to the computer or of receiving and storing user's data present in the computer, the unitary portable data storage device comprising:

a USB plug integrated into the unitary portable data storage device without an intervening cable capable of coupling the unitary portable data storage device directly to a USB socket on a computer;

a single interface, said interface allowing the unitary portable data storage device to communicate via the USB protocol and being coupled to the USB plug;

a non-volatile solid-state memory, *said memory being non-removable from the unitary portable data storage device and having sufficient capacity to enable the unitary portable data storage device to serve as an alternative to a magnetic disk or CD*; and

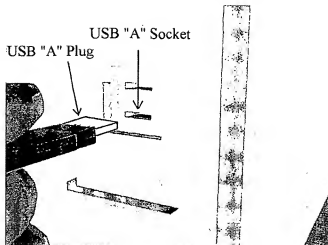
a memory controller, *the memory controller being coupled between the interface and the memory to control the flow of data between the memory and the USB plug in a manner to enable the unitary portable data storage device to operate as an alternative to a magnetic disk or CD*.

(Emphasis provided).

12. In my view, as explained in more detail below, the present application discloses a portable mass storage device that, among other things: (1) includes a USB plug integrated into the device without an intervening cable capable of coupling the device directly to a USB socket on a computer; (2) is of unitary construction; and (3) includes a non-volatile solid-state memory that is non-removable from the device. As presented above, these limitations are expressly recited in claim 22 of the present application. It is also my opinion that the cited references do not teach at least some of these claim limitations. Again, I provide my explanations below.

“Directly Without An Intervening Cable” Limitation

13. In my view, the specification as filed discloses the integrated plug of the USB device is directly plugged into a USB socket of a host computer. For example, on page 5, lines 18-19, the specification states that: “...the plug 1 of the device 10 is plugged into 20 to a USB socket on a computer.”
14. In my opinion, in describing the structure of the portable mass storage device and how the device is connected to the host computer, the specification discloses the physical and electrical characteristics as well as compatibility of the device’s integrated USB plug and the host computer’s USB socket.
15. As mentioned above, the original specification clearly discloses that the claimed device 10 includes a USB plug 1, and that the host computer has a USB socket which the USB plug 1 of the device 10 plugs into.
16. It was well known in the art that host computers include a USB “A”-type socket as illustrated below. The USB Specification defines this. *See USB Specification Revision 1.1*, pages 73-74, attached hereto as Exhibit YK-3.

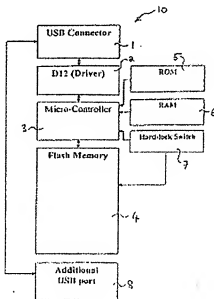


17. Consistent with the USB Specification and the teaching of the patent specification, I understand that USB plug 1 of the device would only be the type that is electrically and physically compatible with the host computer's USB "A"-type socket. This is called a USB "A"-type plug, as illustrated above. The physical and electrical characteristics of the USB "A" plug and the USB "A" socket are defined in the USB Specification.
18. When there is a USB "A" plug and a USB "A" socket, the intuitive and proper way to establish the connection between the two is by directly coupling the USB "A" plug to the USB "A" socket. The use of a cable between a USB "A" plug and a USB "A" socket is explicitly prohibited in the USB Specification. Thus, given the USB Specification and having read the specification of the present application, I clearly understand that the USB plug 1 of the disclosed device would directly connect to a USB socket of a host computer without any intervening cable.
19. The inventors' use of the D12 part in the Figure 1 in combination with the USB plug further supports my conclusion that the patent application discloses an integrated USB plug. D12 is a Philips part. D12 is used as the USB interface controller 2 in the device 10. Those skilled in the art at the time of the invention would understand that the D12 part was designed to be used on a printed circuit board in close proximity to the socket, as opposed to being connected to the socket via an intervening cable. (I should note that at the time of the invention, D12 would typically be proximately connected to a USB "B"-type socket rather than a USB "A"-type plug). I consider eliminating the need of the USB "B"-type socket and an intervening cable disclosed in the present application very innovative.

20. Therefore, it is my opinion that the patent specification as filed unambiguously discloses that the integrated USB plug of the storage device plugs directly into a USB socket on a computer.

“Unitary” and “Memory Being Non-Removable” Limitations

21. In my opinion, in describing and illustrating the structure and elements of the portable mass storage device (Figure 1) as well as the operation of the device, the original specification unambiguously teaches that the portable mass storage device described in the application is of unitary construction with an integrated USB plug and a non-volatile solid-state memory that is a fixed, non-removable element of the device.
22. In reading the present application, I note that the portable mass storage device 10 is consistently referred to as “a portable data storage device” or “the portable storage device” in the singular form. *See, e.g.*, page 1, lines 3 – 4, lines 24 – 25; page 2, lines 8 – 9; page 3, lines 12, 15 – 20 and 22; and page 4, lines 21.
23. Similarly, the elements of the portable mass storage device shown in Figure 1, reproduced below, are collectively referred to as the singular “device 10” throughout the specification.



24. Such description and illustration of the device highlights one of the innovative aspects of the invention — that the device is of unitary construction so it is easily portable and pluggable/removable from the host computer. This follows naturally from the

- background discussion in the specification regarding the shortcomings of prior art mass storage devices and how the present invention eliminates those shortcomings.
25. In discussing the shortcomings of magnetic disks and CD-ROMs, the present application specifically points out that a separate drive mechanism is required in order to access the data on a magnetic disk or CD-ROM. The application also points out that as a surface-based storage device, a magnetic disk or CD-ROM is limited by its surface area. In other words, the storage capacity of a magnetic disk or CD-ROM is constrained by the size of the disk or CD-ROM. These characteristics of magnetic disks and CD-ROMs make them bulky, delicate and generally less than ideal in terms of portability. *See* page 1, lines 13 – 22.
26. In light of this background discussion, it is clear the present invention teaches a portable mass storage device of unitary construction with no removable part, including a fixed, non-removable non-volatile solid-state memory – as opposed to having a combination of a removable memory device and a drive mechanism as in the case of magnetic disks or CD-ROMs, where the disk or CD is routinely taken out of its drive so that it can be carried around to be used at a different drive on a different host computer.
27. Referring to Figure 1, reproduced above, the specification states: “Figure 1 shows a data storage device 10 which includes a USB plug 1 which is coupled to a USB interface device 2. The USB interface device 2 is coupled to a micro-controller 3 which is coupled to a flash memory 4.” Page 3, lines 22 – 24. Having read the entirety of the specification, including Figure 1 and its corresponding description, I do not consider Figure 1 as disclosing a removable memory or a USB plug connected to the device by a cable. Rather, given that portable mass storage device 10 includes a USB plug 1, a USB interface device 2, a micro-controller 3 and a flash memory 4 coupled one after the other as described, it is clear to me that flash memory 4 is a flash memory chip fixedly installed (e.g., soldered to the circuit board) within the device 10 together with micro-controller 3 and USB interface device 2.
28. It is generally understood in the art that unlike certain types of memory chips that are intended to be removable from the device in which the chip is installed (for example, EPROMs can be removed so that its contents can be erased and re-programmed), flash memory chips are fixedly installed within a device and are non-removable under

normal use of the device. The present application does not teach otherwise. Thus, I understand the specification to teach a unitary portable mass storage device with a non-removable flash memory.

29. In addition to the above, I respectfully direct the Examiner's attention to the following disclosure in the specification: "[i]f the installation of the software is complete, ... the device 10 may then be removed [] from the USB socket on the computer" (emphasis provided). Page 7, lines 19 – 22. I note that these passages describe the device, rather than the plug, as being removed from the socket. If the specification had intended to teach a device that requires a cable to connect to the USB socket, it would not have spoken of plugging or removing the device itself into or from the socket. Instead, it would have said, "the plug 1 of the device 10 may then be removed." This further confirms that the unitary portable storage device disclosed in the original specification has an integrated USB plug, allowing the device to be plugged directly into the USB socket on a computer without an intervening cable.
30. As described above, the inventors' use of the Philips' D12 part further supports my opinion that one skilled in the art, reading the patent application, would understand that the invention discloses a device of unitary construction.
31. In sum, when read and understood in the context of the problems in prior art mass storage devices, how the present invention solves those problems and how the disclosed device operates, I find the specification as a whole clearly conveys to me that the portable mass storage device is of unitary construction, having a non-removable memory chip installed within it and a USB plug integrated into it without an intervening cable.

U.S. Patent No. 6,038,320 – The "Miller" Reference

32. I have reviewed the *Miller* reference. The device taught in *Miller* is neither designed to serve as a mass storage device, nor does it have the capability or capacity to do so. Rather, the *Miller* device is designed to limit access to a computer and store only a unique key code and an encrypted password, both of which are of limited size (e.g., *Miller* suggests that the password can be six bytes, see column 3, lines 42 – 43).
33. My review of the *Miller* reference indicates that the device disclosed in *Miller* does not have the requisite capability or capacity to be a mass storage device. *Miller* does not teach using a memory that has a large enough capacity for use in a mass storage

device. Instead, it teaches that its memory is used to store a key code or password of limited size. Similarly, *Miller* does not teach using a memory controller that can handle the data flow in a mass storage device. *Miller* also does not otherwise suggest that the device can be used to store a substantial amount of data. Therefore, I conclude that *Miller* fails to disclose at least the “memory having sufficient capacity” and “memory controller ... to control the flow of substantial amounts of data” claim limitations in claim 22 of the present application.

U.S. Patent No. 6,457,099 – The “*Gilbert*” Reference

34. I have reviewed the *Gilbert* reference and I am of the view that it does not disclose a unitary portable data storage device having a USB plug integrated into it without an intervening cable capable of coupling the unitary portable data storage device directly to a USB socket on a computer.
35. *Gilbert* teaches a programmable dedicated application card (PDAC) that executes dedicated software application(s) stored in the PDAC and sends the results to a user via a host computer to which the PDAC is connected. *See, e.g.*, column 1, lines 45 – 62. *Gilbert* teaches that using a dedicated RISC processor in the PDAC to run software improves execution speed. *Gilbert* also teaches that by running the software on the PDAC instead of on the host computer, resources of the host computer are freed up for other tasks, thereby improving the host’s performance. *See, e.g.*, column 1, line 63 to column 2, line 7.
36. *Gilbert* further states that a PDAC is its own stand-alone computer system, and the use of a PDAC functions as a hardware accelerator and enhances the capabilities of the host computer system. *See, e.g.*, column 2, lines 33 – 36; column 3, lines 21 – 26.
37. However, *Gilbert* does not teach a USB plug integrated into a unitary device or a storage device as recited in claim 22 of the present application. I respectfully disagree that the cited portion of *Gilbert* (column 7, lines 11 – 30) discloses this claim limitation.

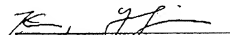
U.S. Patent No. 6,786,412 – The “*Kondo*” Reference

38. I have also reviewed *Kondo* and I am of the view that it does not disclose a unitary portable data storage device having a USB plug integrated into it without an intervening cable capable of coupling the unitary portable data storage device directly to a USB socket on a computer.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the present application or any patent issued thereon.

Respectfully submitted,

Dated: March 17, 2005


Yongmin Kim

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(71) Applicant (for all designated States except US): **TREK TECHNOLOGY (SINGAPORE) PTE LTD** [SG/SG]; 30 Loyang Way #07-13/14/15, Loyang Industrial Estate, Singapore 508769 (SG).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **CHENG, Chong, Seng** [SG/SG]; 129 Loyang Rise, Singapore 507472 (SG).(74) Agent: **MCCALLUM, Graeme, David**; Lloyd Wise, Tanjong Pagar, P.O. Box 636, Singapore 910816 (SG).

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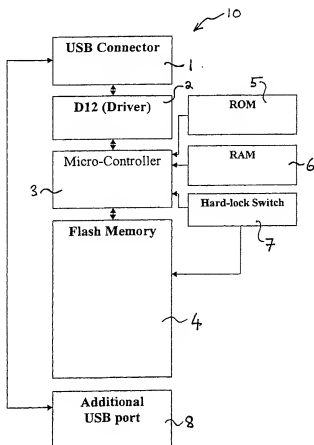
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Published:

— with international search report

[Continued on next page]

(54) Title: A PORTABLE DATA STORAGE DEVICE



(57) Abstract: A portable data storage device (10) includes a universal serial bus (USB) coupling device (1) and an interface device (2) is coupled to the USB coupling device (1). The portable data storage device (10) also includes a memory control device (3) and a non-volatile solid-state memory device (4). The memory control device (3) is coupled between the interface device (2) and the memory device (4) to control the flow of data from the memory device (4) to the USB coupling device (1).



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

A Portable Data Storage Device

The invention relates to a portable data storage device, and in particular, a portable data storage device for a computer.

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Conventional data storage devices generally fall into two categories. The first category is electronic, solid-state memory devices such as read only memory (ROM) and random access memory (RAM). These memory devices are generally fitted within the computer. They are not intended to be removable or
10 portable so that they may be used on different computers, for example, to permit the transfer of data from one computer to another computer.

The second type of device is surface based data storage devices in which data is stored, typically, on the surface of a disk or tape. Examples of surface
15 storage devices are magnetic disks and CD ROMs. Such data storage devices require a mechanical drive mechanism to be installed in or coupled to the computer to permit the data on the storage device to be read by the computer. In addition, such memory devices are limited by the surface area of the storage device, and the combination of the storage device and the drive mechanism for
20 reading data from the storage device is generally bulky and/or delicate due to the moving parts that are required within the drive mechanism and/or storage device.

In accordance with the present invention, there is provided a portable data
25 storage device comprising a coupling device for coupling to a computer serial

bus, an interface device coupled to the coupling device, a memory control device and a non-volatile solid-state memory device; the memory control device being coupled between the interface device and the memory device to control the flow of data from the memory device to the coupling device.

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An advantage of the invention is that by providing a portable data storage device comprising a coupling device with an interface device, memory control device and a non-volatile solid-state memory device, it is possible to provide a portable data storage device which may be coupled to a computer having a serial bus port and which does not include moving parts or require a mechanical drive mechanism to read the data from the data storage device.

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Preferably, the non-volatile solid-state memory device may be a read/write memory device, such as a flash memory device.

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Preferably, where the memory device is a read/write memory device, the memory control device controls the flow of data to and from the memory device.

Typically, the data storage device further comprises a manually operated switch movable between a first position in which writing of data to the memory device is enabled, and a second position in which writing of data to the memory device is prevented.

Preferably, the memory control device may include a read only memory which stores a program to control the operation of the memory control device.

Preferably, the memory control device is a micro-controller.

- 5 Typically, the interface device comprises a universal serial bus (USB) driver to convert data between a USB format and a PC format, and the coupling device comprises a USB coupling device.

- Alternatively, the interface device comprises a driver for IEEE 1394 (Firewire)
10 protocol, and the coupling device comprises a Firewire coupling device.

An example of a data storage device in accordance with the invention will now be described to the accompanying drawings, in which:

- 15 Figure 1 is a schematic block diagram of a portable data storage device;
Figure 2 is a flow diagram showing the initial setup of the data storage device by a software supplier;
Figure 3 is a flow diagram showing the initial setup of the data storage device by an end user; and
20 Figure 4 is a flow diagram showing operation of the data storage device.

Figure 1 shows a data storage device 10 which includes a USB plug 1 which is coupled to a USB interface device 2. The USB interface device 2 is coupled to a micro-controller 3 which is coupled to a flash memory 4. The micro-controller

3 includes a read only memory (ROM) 5 which stores a program to control the operation of the micro-controller 3.

The operations performed by the micro-controller 3 include comparing
5 passwords entered by a user with a corresponding password stored in the flash memory 4 to determine whether the user is authorised to access the contents of the flash memory 4. The program stored in the ROM 5 also controls the data flow to and from the flash memory 4 and can also detect whether the computer to which the memory device 1 is coupled has installed software programs which
10 correspond to passwords stored in the flash memory 4. The micro-controller 3 can automatically retrieve passwords from the installed software to compare with passwords stored in the flash memory to verify that a user of the computer is authorised to access and run the software. In addition, the program stored in the ROM 5 also permits the setting of a password in the flash memory by a
15 software supplier to correspond to the password contained in software supplied to a user. Typically, the password may correspond to the serial number of the software.

The flash memory 4 is typically divided into a number of different sections or
20 zones. Typically, the flash memory is divided into two zones and each zone has a unique password. If the data storage device 10 is supplied with packaged software, the software serial number can be set in one zone to be the password to permit a user to access and use the software. The other zone, which can be used typically for storing a user's data, may have a separate password which is
25 set by the user. Typically, the passwords are stored in a secure location of the

flash memory in an encrypted form. The encryption, decryption, data flow control and USB protocol are all managed by the micro-controller 3.

The micro-controller 3 also includes a random access memory (RAM) 6 which is
5 a temporary storage area to permit functioning of the micro-controller 3. In addition, a manual switch 7 is coupled between the flash memory 4 and the micro-controller 3. The manual switch 7 is movable between a first position in which a user may write data to the flash memory 4 and a second position in which data is prevented from being written to the flash memory 4.

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The device 10 also includes a USB socket 8 that is coupled directly to the USB plug 1 and permits other USB devices to be coupled to the USB via the device
10. For example, if a user wishes to increase memory space, a USB plug 1 of a second memory device 10 may be connected to the USB socket 8.

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Figure 2 is a flow diagram showing the set up procedure for the device 10 for a software supplier when the software supplier intends to supply the device as an authentication device for the software. Firstly, the plug 1 of the device 10 is plugged into 20 to a USB socket on a computer. After the device 10 has been
20 plugged into the USB socket on the computer, a communication is established 21 between the computer and the device 10. The software supplier has pre-installed installation software on the computer which is run by the operator. From the pre-installed software, the operator selects password set up installation 22, in response to which the pre-installed software requests the
25 operator to enter a password or serial number corresponding to the software

with which the device 10 is to be supplied. The password or serial number is then encrypted 26 and stored 27 in the flash memory 4.

Figure 3 is a flow diagram showing the initial set-up of a password for zone 2 of the flash memory 4 by an end user. The device 10 is typically supplied with driver software that is loaded by the user onto the computer prior to set-up of the device. To set-up the password for zone 2 the user plugs in 20 the device 10 into a USB port on the computer and communication 21 is established between the computer and the device 10. The user then runs the driver software and the driver software enters a password installation set-up mode 23 for zone 2. The user then enters 28 a password that they wish to use to prevent unauthorised access to zone 2 of the flash memory 4. The password entered is then encrypted 29 and stored 30 in the flash memory 4.

After an end user has performed the initial password set up procedure described above and shown in Figure 3, when a user plugs in 20 the device 10 to a USB port on a computer, the computer will establish a communication 21 with the device 10 and firstly, checks 33 an installation status flag stored in the flash memory 4 (see Figure 4). If the status flag is "Y", the device 10 outputs 34 an "OK" flag to the computer. The micro-controller 3 then instructs the computer to issue a request 35 to the user to select the zone they wish to enter. If the status flag is "N", the device does not output an "OK" flag to the computer, and goes straight to step 35. In response to the request 35 for zone selection, the user selects 36 either zone 1 or zone 2.

If zone 1 is selected, the device 10 assumes that the user wishes to install software on the computer which is stored in the flash memory 4 and requests 37 the appropriate password for confirmation that the user is authorised to install the software. The micro-controller 3 receives the password entered by the user, retrieves the zone 1 password stored in the flash memory 4, decrypts the zone 1 password and compares it with the password entered by the user to authenticate 38 whether the user is authorised to install the software. If the passwords do not match, the device 10 prompts the computer to request 37 the user to enter the password again.

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If the password entered by the user matches the password stored in the flash memory 4, the micro-controller 3 starts 39 the software installation from the flash memory 4 to the computer. In order to install software, the computer sends 40 a read/write command in USB format to the micro-controller 3 for data, the micro-controller 3 retrieves the requested data from the flash memory 4 and sends 41 the data to the driver 2. The driver 2 converts 42 the data to PC format and outputs the data to the computer through the USB plug 1. The micro-controller 3 then checks 43 whether the software installation is complete. If the operation is not complete, the operation returns to step 40. If the installation of the software is complete, the status flag stored in the flash memory 4 is changed to "Y" and the device 10 may then be removed 45 from the USB socket on the computer.

If a user selects zone 2, the micro-controller 3 sends a command to the computer to request 46 the user to enter the password for zone 2. When the

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user enters the password, the computer sends the password to the micro-controller 3. The micro-controller 3 retrieves the password for zone 2 from the flash memory 4, decrypts 47 the password and compares it with the password entered by the user. If the password entered by the user is incorrect, the
5 operation returns to step 46 and the computer requests 46 the user for the password again.

If the password entered by the user is correct, the user has access to zone 2 of the flash memory 4 to read data from the flash memory 4 and to write data to
10 the flash memory 4. However, data can only be written to the flash memory 4 if the manual switch 7 is in the position to permit data to be written to the flash memory 4. In order to read or write data from or to the flash memory 4 a read or write command is sent 48 by the computer in USB format to the micro-controller 3. In response to the read or write command the micro-controller 3
15 either retrieves 49 data from the flash memory 4 and sends it to the driver 2 for conversion 50 to PC format and then to be output to the computer or receives data from the driver to write it to the flash memory 4.

The micro-controller 3 then determines 51 whether the read or write operation is
20 complete. If the operation is not complete it returns to step 48. If the operation is complete the operation terminates 52.

The device 10 described above is for coupling to a universal serial bus (USB). However, the plug 1, the interface device 2 and socket 8 could be for use with
25 any appropriate computer serial bus. For example, the device 10 could be

modified for use with IEEE 1394 (Firewire) protocol by substituting the USB plug 1, USB interface device 2 and socket 8 with a Firewire protocol compatible plug, interface device and socket respectively.

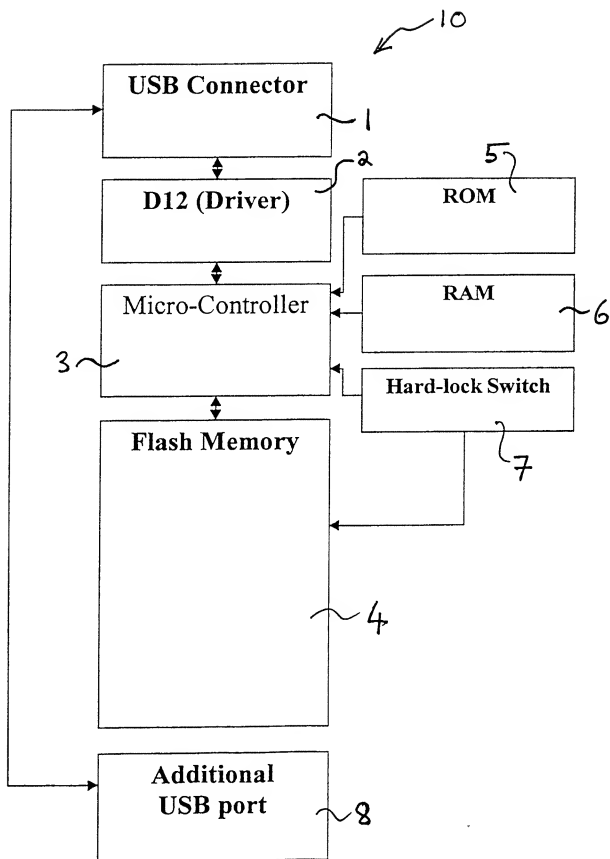
- 5 An advantage of the device 10 described above is that it provides a portable data storage device for a computer which does not require a mechanical operated reading/writing device. In addition, the device 10 has no moving parts. This enables to data storage device 10 to be more compact than conventional portable data storage devices.

CLAIMS

1. A portable data storage device comprising a coupling device for coupling to a computer serial bus, an interface device coupled to the coupling device, a memory control device and a non-volatile solid-state memory device; the
5 memory control device being coupled between the interface device and the memory device to control the flow of data from the memory device to the coupling device.
2. A device according to claim 1, wherein the non-volatile solid-state
10 memory device is a read/write memory device.
3. A device according to claim 2, wherein the read/write memory device is a flash memory device.
- 15 4. A device according to claim 2 or claim 3, wherein the memory control device controls the flow of data to and from the memory device.
5. A device according to any of claims 2 to 4, further comprising a manually operated switch movable between a first position in which writing of data to the
20 memory device is enabled, and a second position in which writing of data to the memory device is prevented.
6. A device according to any of the preceding claims, wherein the memory control device comprises a micro-controller.

7. A device according to any of the preceding claims, wherein the coupling device comprises a universal serial bus coupling device and the interface device comprises a USB driver.
- 5 8. A device according to any of the preceding claims, wherein the coupling device comprises an IEEE 1394 (Firewire) protocol coupling device and the interface device is a Firewire protocol driver.

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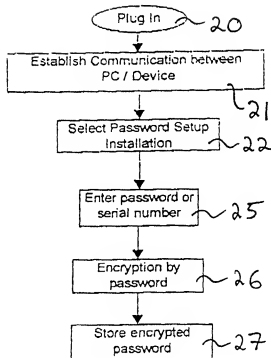


Figure 2

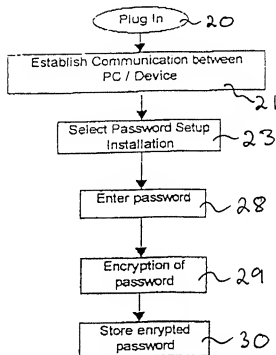


Figure 3

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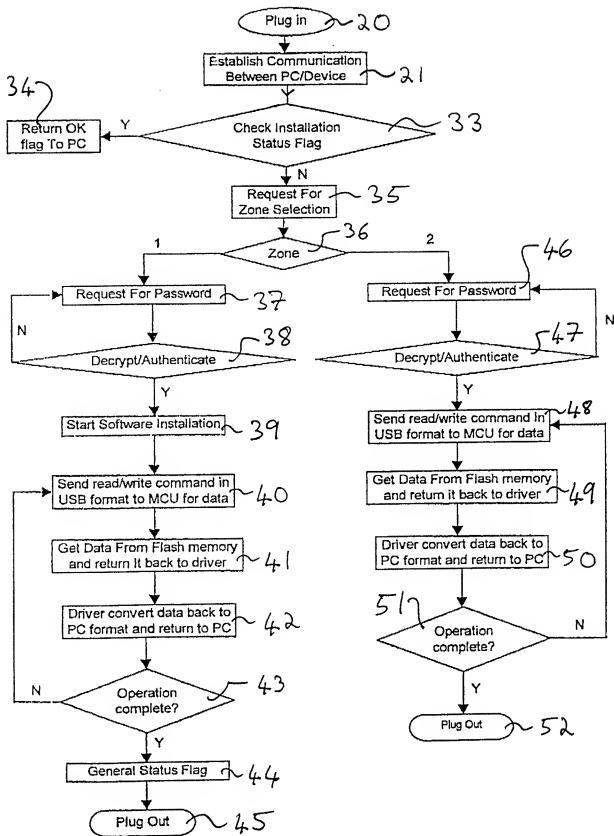


Figure 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SG 00/00029

CLASSIFICATION OF SUBJECT MATTER

IPC⁷: G11B 11/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC⁷: G11B 11/00, 02,05

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

G06F 3/00, 12/00, 12/06

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6016530 A (AUCLAIR et al.) 18 January 2000 (18.01.00)	1
P,A	US 6058441 A (SHU) 2 May 2000 (02.05.00)	1
A	US 5760986 A (MOREHOUSE et al.) 2 June 1998 (02.06.98)	1

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

„A“ document defining the general state of the art which is not considered to be of particular relevance

„E“ earlier application or patent but published on or after the international filing date

„L“ document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

„O“ document referring to an oral disclosure, use, exhibition or other means

„P“ document published prior to the international filing date but later than the priority date claimed

„T“ later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

„X“ document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

„Y“ document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

„&“ document member of the same patent family

Date of the actual completion of the international search

24 March 2001 (24.03.2001)

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Name and mailing address of the ISA/AT

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/SG 00/00029

Patent document cited in search report			Publication date	Patent family member(s)			Publication date
US	A	5760986	01-06-1998	EP	A1	614564	14-09-1994
				EP	A4	614564	19-07-1995
				US	A	5379171	03-01-1995
				WO	A1	9306594	01-04-1993
				US	A	5835303	10-11-1998
				US	A	5579189	26-11-1996
				US	A	5592349	07-01-1997
				US	A	5694267	02-12-1997
				US	A	5867340	02-02-1999
				US	A	5778418	07-07-1998
US	A	6016530	18-01-2000				
US	A	6058441	02-05-2000	none			

APPENDIX C: RELATED PROCEEDINGS APPENDIX

NONE.